بسم الله الرحمن الرحيم

عنوان المحاضرة: Ureteral and Bladder Injuries
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Ureteral Trauma:

Incidence: 1 % of all GUT injuries

Protective Mechanisms: 1-Tubular structure 2- Protected Location (Retro-Peritoneal)
3- Small Size 4- Mobility (with the kidney of mobility)

Etiology of Injury:

1-Iatrogenic (75%):

a-Open surgical Injury: Most of these injuries are gynecological in origin (e.g. Ligature)

**How to identify ureter? -Tubular –retroperitoneal - posterior to iliac vessels (water under bridge), -With peristalsis movement -Gives urine in aspiration -If there is a stone→ can be palpated

**Factors increase incidence of Injury during operation: -Pelvic irradiation -Recurrent Surgery

b-Laparoscopic Injury: also mostly gynecological (e.g. Endometriosis)

c-Ureteroscopic Injury: *Factors associated with higher complication rates during ureterscopy:
1-Longer surgery times 2-Surgeon inexperience 3-Previous irradiation 4-TTT of Renal Calculi

**Electrohydraulic Lithotripsy has a higher incidence of injury than Neodymium YAG Laser (Nd. Laser)

**Protect against injury by using small and flexible ureteroscopies

2-Other causes: (Less common) e.g. blunt and penetrating trauma

Classification of Ureteral Injury (According to AAST):

Grade I: Hematoma (Contusion or hematoma without devascularization)

Grade II: Laceration < 50 % of circumference **Grade III:** Laceration > 50 % of circumference

Grade IV: Complete tear with < 2cm devascularization

Grade V: Complete tear with > 2cm devascularization

Evaluation & diagnosis:

*-No classical clinical symptoms & signs *Suspicious in all cases of penetrating trauma

Imaging

1-U/S → Demonstrate: - Extravasation -Upper tract obstruction (with dilatation is above its level)

2-IVU → -Extravastion at site of Injury –Incomplete visualization –upper tract obstruction

3-Retrograde (Ascending) ureterography: * site of extravasation of the dye is the site of injury

4-CT: injury manifest with absence of contrast

**Do ALL investigations available to localize site of injury before operation as each level of ureter has different approach of incision:

*upper→ Last rib tip *Middle→ 2 finger breadth above iliac creast *Lower → suprapubic midline

Management:

1-Internal Stenting: (double J stent)
For minor injury (Grade I,II) →keep ureter patent and drained away from injury

2-Reconstructive Repair:

*Principles: -Mobilize carefully to preserve the adventitia -Debridement until the edges bleed
-Repair ureter with spatulation for reducing the distal ureteral stenosis

3-Planned Stage repair:

Silk tics (non-absorbable) of the end of the damaged area + percutaneous nephrostomy drainage

Types of reconstructive repair:

A) Upper Ureter: 1-Ureteroureterostomy 2- Transureteroureterostomy 3-Ureterocalycostomy
B) Middle Ureter: 1-Ureteroureterostomy 2- Transureteroureterostomy 3-Boari Flap
C) Lower Ureter: 1-Ureteroneocystostomy 2-Psoas bladder hitch

4-Complete ureteral loss: *Autotransplantation 2-Ileal Interposition

Bladder Trauma:

Epidemiology: -Blunt Trauma: 65-85% -Penetrating: 15-35%
-70-97% of Bladder rupture → Associated with **Pelvic fracture**
-Iatrogenic: with gynecological surgery (e.g. Hysterectomy)

Classification:

Grade I: Hematoma or Laceration of partial thickness
Grade II: Extraperitoneal bladder wall laceration <2 cm
Grade III: Extraperitoneal (>2cm) or intraperitoneal (<2cm) bladder wall laceration
Grade IV: Intraperitoneal bladder wall laceration >2cm
Grade V: Intraperitoneal or extraperitoneal bladder wall laceration extending into the bladder neck or ureteral orifice (trigone)

Evaluation & Diagnosis:

Most common symptom → hematuria (82-100%) or Abdominal wall tenderness (60%)
*If marked extravasation → perineum and scrotum

Imaging:

1-Retrograde Cystography:
*Bladder neck and trigone → extraperitoneal extravasation *Bladder dome → intraperitoneal
2-Others (IVU - CT - U/S)

Management:

-Hematoma or extraperitoneal injury → Just Foley's catheter and follow up
-Any intraperitoneal collection is indication for exploration and repair
*Exploration is mandatory in: 1-Intrapertoneal collection 2-Bladder neck or ureteric orifices involve.
Incision is Transabdominal (suprapubic)
** Look on the dome transperitoneal and be sure of no collections, and install a suprapubic tube for drainage beside the urethral catheter (Dual Drainage)